

## [COMMUNICATION]

**Karyotype of the Loggerhead Turtle,  
*Caretta caretta*, from Japan**

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**ABSTRACT**—The karyotype of the loggerhead turtle, *Caretta caretta*, from Japan was studied by bone marrow-Giemsa staining technique. This species has  $2n=56$  homologous chromosomes, consisting of 12 metacentric, 2 submetacentric, 6 subtelocentric, 12 acrocentric macroelements and 24 micro-elements in a graded series. Comparison of the present karyotype with other cheloniid species confirmed the strong chromosomal conservativeness within the family.

**INTRODUCTION**

The karyotype of the loggerhead turtle, *Caretta caretta* was studied first by Nakamura [1]. He reported that the chromosome number of this species from Shirahama, Kii Peninsula, Japan was 51 in the female and 52 in the male showing the sex chromosome heteromorphism. Later, Nakamura [2] checked a larger sample and corrected the number to be 57 in the female and 58 in the male. On the other hand, Bickham [3] and Bickham and Carr [4] noted that the turtle from unknown localities had 56 chromosomes without providing detailed description of the karyotype. The differences between the results of Nakamura [1, 2] and of later authors [3, 4] might indicate the existence of intraspecific chromosome variation within *Caretta caretta*. However, the other possibility is that Nakamura miscounted chromosome numbers, since he employed testis-sectioning methods which sometimes provide wrong data [5]. In order to test Nakamura's data, I reinvestigated the karyotype of the sample from Kii Peninsula, by bone marrow-

air dry method.

**MATERIALS AND METHODS**

Four hatchlings (one male and three females) were used. The mother turtles were caught from the coastal waters of Kushimoto, Kii Peninsula, and oviposited in captivity.

The hatchlings were injected with 0.1 ml of colchicine solution (1  $\mu\text{g/ml}$ ) per gram of body weight. Twenty hr after the injection, the femur bone marrows were taken out, treated with hypotonic solution following Ota *et al.* [6] and fixed in Carnoy's solution. Metaphase chromosome spreads were obtained by an air-dry method stained with 2% Giemsa solution. Each specimen was sexed by microscopic examination of gonadal sections.

**RESULTS AND DISCUSSION**

Twelve cells from a male and six from three females exhibited  $2n=56$  chromosomes in a graded series. Of these, pairs 2, 6, 8-10 and 13 were regarded as metacentric, pair 1 submetacentric, pairs 3, 12 and 14 subtelocentric, and pairs 4, 5, 7, 11, 15 and 16 acrocentric elements. The remainders were classified as microchromosomes. No sex chromosome heteromorphism was evident in either sex (Fig. 1).

The chromosome number of the present sample agrees with that reported by Bickham [3] or Bickham and Carr [4], but considerably differs from those reported by Nakamura [1, 2], although there is only a little distance between each locali-

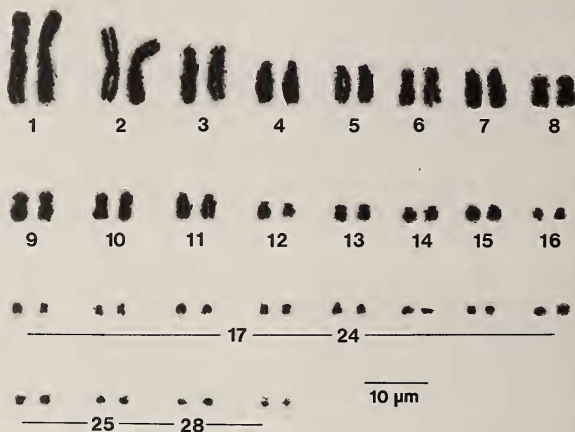


FIG. 1. Karyotype of a female *Caretta caretta* from Kii, Japan.

ties. Thus, it is highly probable that the chromosome numbers provided by Nakamura [1, 2] were in reality incorrect due to the unreliable method he adopted.

Several authors postulated that the pattern of karyotypic variation in the suborder Cryptodira is basically conservative, and that all or most of the species within a family appear karyotypically identical [4, 7]. The karyotype of *Caretta caretta* seems to agree with those of *Chelonia mydas* and *Lepidochelys olivacea* reported by Bickham *et al.* [8] and Bhunya and Mohanty-Hejimdi [9], respectively. The close resemblance among karyotypes of these sea turtle species belonging to different genera seem to support the above assumption. Even so, however, it is required to examine the other three chelonid species [10], whose karyological data are presently unavailable, to draw a conclusion upon the variability of the karyotype in this family.

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#### REFERENCES

- 1 Nakamura, K. (1937) Jap. J. Genet., **13**: 240.
- 2 Nakamura, K. (1949) La Kromosomo, **5-6**: 205-213.
- 3 Bickham, J. W. (1981) Science, **212**: 1291-1293.
- 4 Bickham, J. W. and Carr, J. L. (1983) Copeia, **1983**: 918-932.
- 5 Gorman, G. C. (1973) In "Cytotaxonomy and Vertebrate Evolution". Ed. by A. B. Chiarelli and E. Capanna, Academic Press, New York, pp. 349-424.
- 6 Ota, H., Matsui, M., Hikida, T. and Tanaka, S. (1987) Experientia, **43**: 924-925.
- 7 Bickham, J. W. (1983) In "Chromosomes in Evolution of Eukaryotic Groups, vol. 2". Ed. by A. K. Sharma and A. Sharma, CRC Press, Inc., Boca Raton, Florida, pp. 14-36.
- 8 Bickham, J. W., Bjørndal, K. A., Haiduk, M. W. and Rainey, W. E. (1980) Copeia, **1980**: 540-543.
- 9 Bhunya, S. P. and Mohanty-Hejimdi, P. (1986) Chrom. Inf. Serv., **40**: 12-14.
- 10 Pritchard, P. C. H. (1979) Encyclopedia of Turtles. T. F. H. Publ., Neptune, N. J.